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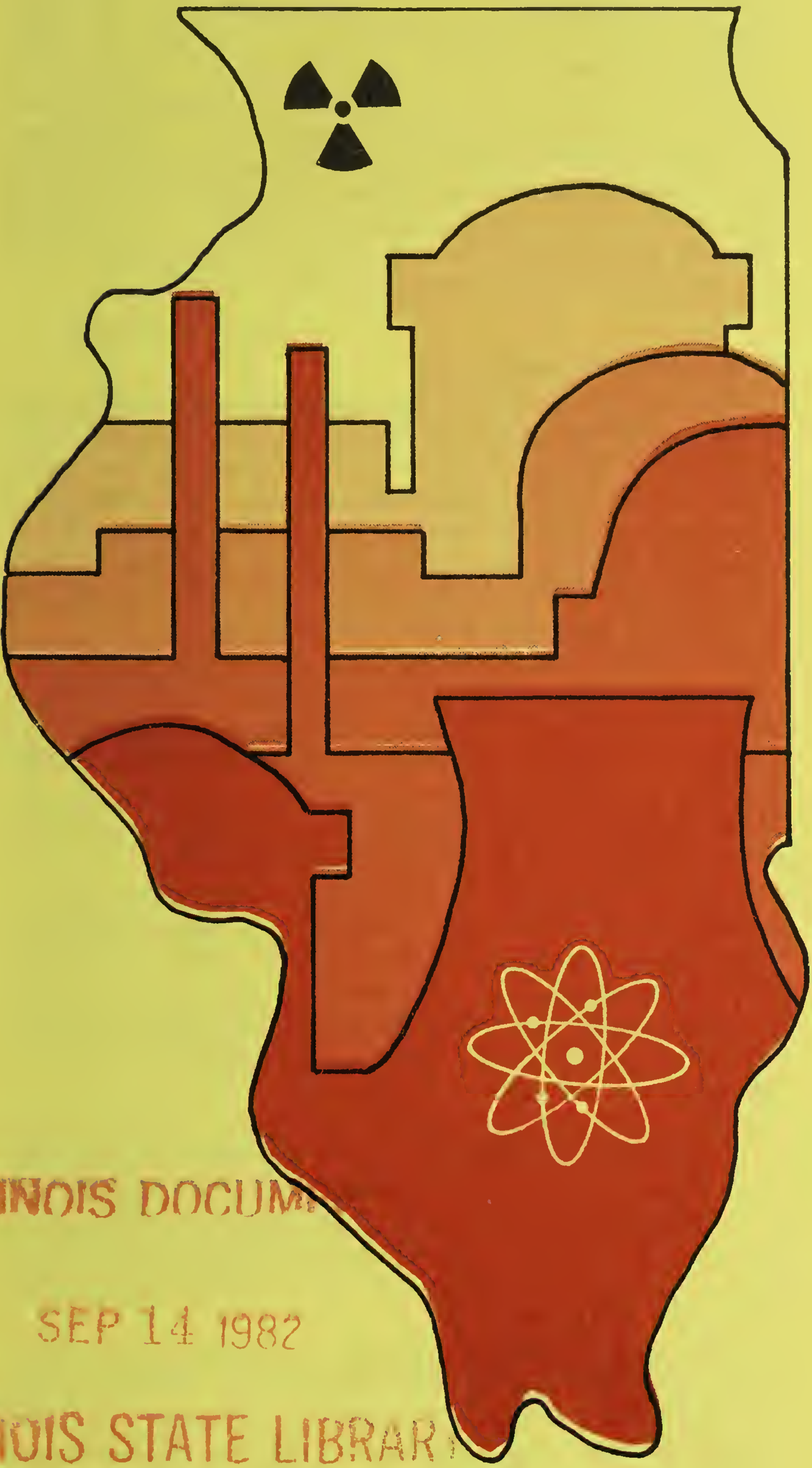
NUCLEAR POWER
AND
YOUR SAFETY



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The Illinois Department of
Nuclear Safety

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The Illinois Department of Nuclear Safety (IDNS) was created to ensure that Illinois is prepared to deal with nuclear and radiological concerns on a continuous basis. The Illinois Nuclear Safety Preparedness Act of 1979 established funds to do just that. Provisions of the Act give IDNS the authority to develop early warning capabilities and to establish an emergency response plan to detect and deal with nuclear accidents. Remote Effluent Monitoring and Emergency Planning and Preparedness are the two major programs designed to meet the Act's requirements. These programs are supplemented by training sessions for emergency response personnel and annual drills held at each nuclear power station. Specialized response equipment provides the support necessary to fulfill the goals of these programs. Funding is provided by fees collected from operating nuclear power plants and away-from-reactor spent fuel storage facilities.

Remote Effluent Monitoring

The Remote Effluent Monitoring System will be capable of continuously identifying and quantifying the radioactive components of all materials released from nuclear facilities to the environment. The LaSalle County Nuclear Power Station is currently serving as the pilot project for the Remote Effluent Monitoring System. After evaluation of the system's performance at the LaSalle plant, equivalent facilities will be installed at the state's remaining nuclear power stations.

IDNS has five identifiable components in this system. The heart of the system is the Radioactive Gaseous Effluent Monitoring System (RAGEMS). This system is provided with continuous samples taken directly from the stack of the nuclear power station. It identifies and quantifies the isotopic components of the gases released. The sample data collected is then stored in the system's on-site computer.

The second component of the Remote Monitoring System is Meteorological Information. Atmospheric temperature and wind direction at different altitudes, precipitation levels, and wind speed are supplied by the utility's computer on a minute-by-minute basis. This component analyzes various weather conditions, which is vital to the protection of local residents in the event of a radioactive release.

Plant instrumentation provides the earliest indication of a potential release at a nuclear reactor. Monitors located in the containment area around the reactor supply essential information on deviations from the normal levels. The instrumentation monitors containment and effluent radiation levels and effluent flow rate. Information from the monitors is gathered by the utility's computer.

A ring of environmental monitors is used to provide an independent confirmation of release and meteorological measurements. These monitors also provide some capability for determining the environmental impact of a release through pathways other than the stack. The monitors completely surround the plant at a distance of approximately two and one-half miles.

The last component of the system is the dedicated computer facilities which accept, display, and store the resulting information in an appropriate manner. The facilities include an on-site computer at the nuclear power station, within which the RAGEMS, meteorological, plant status, and environmental data are collected and stored. The on-site computers are connected to the central computer located at IDNS headquarters in Springfield by high speed telecommunications lines. Additional calculations involving atmospheric dispersion and projected environmental consequences are performed at the central computer facility.

Emergency Planning and Preparedness

As stated in the Nuclear Safety Preparedness Act, the development of an emergency plan for the state's nuclear power stations is mandatory. To fulfill this requirement, the Illinois Plan for Radiological Accidents (IPRA) was adopted by the state for the protection of the citizens in the area surrounding each nuclear power station.

IDNS plays a major role in IPRA through two functional subgroups established to respond to a nuclear-related accident or incident. They consist of the Radiological Emergency Assessment Center (REAC), which is located in Springfield, and the Radiological Assessment Field Team (RAFT), which is dispatched from Springfield to the accident location if necessary.

REAC serves as the Emergency Operations Command Center for all radiological functions associated with response to a nuclear accident affecting the State of Illinois. REAC houses the central computer used for remote monitoring. The REAC staff assesses and directs all activities associated with the IDNS response to a nuclear accident. Decisions made by REAC during assessment are initiated through RAFT.

RAFT assesses and confirms radiological accident conditions in the field. RAFT consists of a Mobile Nuclear Laboratory, a Mobile Command Center, support vehicles, and associated sampling and monitoring staff.

The Mobile Nuclear Laboratory contains specialized environmental monitoring equipment which can analyze the quantity and type of radiation emitted and determine the amount of personnel exposure. The lab is also equipped with computer terminals connected by dedicated telephone lines to the central computer at REAC, over which environmental radiation measurements are transmitted for assessment.

The Mobile Command Center is equipped with charts,maps, radio-communication equipment, and computer terminals. Through REAC directives, the Command Center coordinates the monitoring and sampling efforts of the field personnel. Additional RAFT activities include exposure, ingestion, and contamination control; plume verification; communication and logistical support; and staffing of decontamination centers.

The major area covered by IPRA is the Emergency Planning Zone (EPZ). The EPZ consists of the area within a ten mile radius of the nuclear power station, and is divided into 16 sectors. The purpose of the EPZ is for radiation detection, monitoring, and protection.

Classification of emergency conditions is also used for radiation detection and protection. In the event of a nuclear incident affecting a nuclear power station, REAC categorizes the incident into one of four classes of emergency conditions established by IPRA in accordance with federal regulations. The operating utility initiates IPRA by notifying the Emergency Services and Disaster Agency (ESDA) and IDNS via the Nuclear

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Accident Reporting System (NARS) direct communication line. After an accident has been reported, classification is necessary in responding to it because specific conditions warrant specific emergency response and notification of the proper authorites. The gradation classifications provide early and prompt notification to response personnel of minor events which could lead to more serious consequences. The four classifications of emergency conditions and emergency response personnel responsible are:

1) **Unusual Event**-Specific situations indicating potential degradation of the level of safety at a nuclear station. No release of radioactive material requiring off-site response or monitoring is expected unless further degradation of safety systems occur. IDNS and ESDA are notified.

2) **Alert**-Events involving actual or potential substantial degradation of plant safety levels. An Alert condition initiates a rapid transition to a state of readiness by plant personnel. IDNS and its key personnel as well as ESDA and its key personnel are notified.

3) **Site Area Emergency**-Events which involve major failures of plant functions needed for the protection of the public. Release may be sufficient to warrant protective measures. Notifications same as Alert condition, plus all key state agencies, including the Office of the Governor, Illinois Department of Transportation, Illinois State Police, and all local governments within the EPZ. Activation of site organizations is also carried out.

4) **General Emergency**-Events involving actual or imminent substantial core degradation or melting, with the likelihood of a related release of fission products to the environment and off-site consequences requiring protective measures as a matter of prudence or necessity. Full activation of IPRA, including recommendation of protective actions and notification of the public is carried out.

Each of these responses may be altered or intensified according to the changing circumstances of the incident.

Local governments are responsible for carrying out protective actions, such as sheltering, putting farm animals on stored feed, and evacuating. State and federal agencies and support groups help local governments carry out the operational functions, under the coordination of ESDA. Technical functions of IPRA are performed by IDNS, with support from the utility and state and federal agencies.

Drills and Training

To test IPRA, drills are held annually at each nuclear power station in the state. These drills are held to test the radiological emergency response preparedness of the state and local emergency workers in the EPZ of each plant. The drills are evaluated by the Federal Emergency Management Agency, which develops national standards for handling all types of emergencies. Training sessions are also held annually to train local emergency workers in the principles of basic radiation protection and dose calculation. IDNS is responsible for these training sessions, which are held prior to each of the annual drills.

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SPEAKER'S BUREAU

The Illinois Department of Nuclear Safety has established a Speaker's Bureau designed to inform interested organizations and groups throughout the state about nuclear and radiological issues. Agency personnel are available to discuss a wide range of subjects, including:

- Reactor Safety
- Monitoring Nuclear Facilities
- Emergency Preparedness
- Illinois Plan for Radiological Accidents (IPRA)
- General Radiation Protection
- Biological Effects of Radiation
- Low Level Waste Management
- Spent Fuel Storage

Parties interested in arranging for a guest speaker should contact:

**The Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, Illinois 62704
(217) 546-8100**

There is no charge for this public service from IDNS.

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